UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,160	04/22/2004	Takamitsu Asanuma	110108.01	5738

25944 7590 05/02/2006

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
NGUYEN, TU MINH	
ART UNIT	PAPER NUMBER
3748	

DATE MAILED: 05/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/829,160	ASANUMA ET AL.	
	Examiner	Art Unit	
	Tu M. Nguyen	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/904,875.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. An Applicant's Amendment filed on March 1, 2006 and an Applicant's Supplemental Amendment filed on March 3, 2006 have been entered. Claims 4-6 have been added with claim 4 amended in the Supplemental Amendment. Overall, claims 1 and 4-6 are pending in this application.

Drawings

2. The formal drawings filed on April 22, 2004 have been approved for entry.

Double Patenting

3. Claims 4-6 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2-4, respectively, of copending Application No. 09/904,875. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 4 in the instant application is broader in scope than claim 2 of the copending Application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible

harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seto et al. (Japan Publication 6-117221) in view of Hirota et al. (Japan Publication 6-159037).

As shown in Figures 1 and 9 and indicated in the translated Abstract, Seto et al. disclose a device for purifying the exhaust gas of an internal combustion engine, comprising:

- a NOx absorbent (20) arranged in the exhaust system, which carries a catalyst (an alkali metal) for absorbing and reducing NOx and an oxidation catalyst (platinum) to absorb oxygen in the exhaust gas, the catalyst absorbing NOx when the air-fuel ratio in the surrounding atmosphere thereof is lean and releasing the absorbed NOx when the air-fuel ratio is stoichiometric or rich;

- a catalytic apparatus (17) for purifying NOx arranged in the exhaust system upstream of the NOx absorbent, the catalytic apparatus carries a catalyst (an alkali metal) for absorbing NOx when the air-fuel ratio in the surrounding atmosphere thereof is lean and releasing the absorbed NOx when the air-fuel ratio is stoichiometric or rich; and

- control means (50, 11) for making the air-fuel ratio in the catalytic apparatus (17) rich to release NOx therefrom and purify the released NOx by reduction, and making the air-fuel ratio in the NOx absorbent (20) rich to release NOx from the catalyst of the NOx absorbent (20) to purify the released NOx by reduction and to release oxygen from the oxidation catalyst and thus to cancel oxygen saturation or contamination on the oxidation catalyst of the NOx absorbent.

Seto et al., however, fail to disclose that the NOx absorbent also has a function of a particulate filter.

As shown in Figures 1 and 2, Hirota et al. teach that it is conventional in the art to use a particulate filter (10) which carries a NOx absorber (26) for absorbing and reducing NOx. As clearly illustrated in Figure 2, the particulate filter is a wall-flow device comprising a plurality of partition walls having pores, the partition walls carrying a NOx absorber (26) on the exhaust gas upstream side surface for absorbing and reducing NOx. A controller in Hirota et al. makes the air-fuel ratio in the particulate filter rich to release NOx and active-oxygen from the NOx

absorber to purify the released NOx by reduction, and to oxidize the particulates trapped on the filter by the released active-oxygen. As indicated in the translated Abstract, the heating in the NOx releasing and reduction causes elevated temperature in the filter, which induces the trapped soot to be oxidized easily. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have replaced the NOx absorbent in Seto et al. with the particulate filter taught by Hirota et al., since the use thereof would have reduced harmful soot emissions in the exhaust gas and saved fuel by inducing soot to combust at an earlier time.

Hirota et al., however, fail to teach or suggest that the trapped soot is oxidized without producing a luminous flame.

Since the heating in the NOx releasing and reduction in Hirota et al. causes elevated temperature in the filter, which induces the trapped soot to be oxidized easily, the trapped soot is also oxidized at a lower temperature. One with ordinary skill in the art also recognizes that at a lower temperature, the trapped soot in Hirota et al. is oxidized without producing a luminous flame. Moreover, since the particulate filter in Hirota et al. is operated in an exact manner as that in the pending application to oxidize the trapped soot, there is a similar functionality between Hirota et al. and the pending application. This similar functionality leads one with ordinary skill in the art to realize that the trapped soot in Hirota et al. is also oxidized without producing a luminous flame.

7. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dou et al. (U.S. Patent Application 2001/0035006) in view of Hirota et al. (Japan Publication 6-159037).

Re claim 4, as depicted in Figure 17, Dou et al. disclose a device for purifying the exhaust gas of an internal combustion engine, comprising:

- a particulate filter (6) arranged in the exhaust system (see claim 10);

- a NOx adsorber (4) carries a catalyst for absorbing and reducing NOx, the catalyst absorbing NOx when the air-fuel ratio in the surrounding atmosphere thereof is lean and releasing the absorbed NOx to purify NOx by reduction when the air-fuel ratio is stoichiometric or rich;

- a catalytic apparatus (3) for purifying NOx arranged in the exhaust system upstream of the particulate filter, which catalytic apparatus carries a catalyst (noble metals, barium) absorbing NOx when the air-fuel ratio in the surrounding atmosphere thereof is lean and releasing the absorbed NOx when said air-fuel ratio is stochiometric or rich (see paragraphs 0039, 0041, and 0042);

- control means (2A or 2B) for making the air-fuel ratio in the catalytic apparatus (3) rich to release NOx from the catalyst of the catalytic apparatus to purify the released NOx by reduction and making the air-fuel ratio in the NOx adsorber (4) rich to release NOx from the catalyst of the NOx adsorber to purify the released NOx by reduction; and

- bypassing means (5A) to make possible the exhaust gas bypass the NOx adsorber and the particulate filter located downstream of the catalytic apparatus (3).

Dou et al., however, fail to disclose that the particulate filter and the NOx absorber can be combined into one single housing.

As shown in Figures 1 and 2, Hirota et al. teach that it is conventional in the art to use a catalyzed particulate filter (10) which carries a NOx absorber (26) for absorbing and reducing NOx. As clearly illustrated in Figure 2, the catalyzed particulate filter is a wall-flow device comprising a plurality of partition walls having pores, the partition walls carrying a NOx

absorber (26) on the exhaust gas upstream side surface for absorbing and reducing NOx. A controller in Hirota et al. makes the air-fuel ratio in the catalyzed particulate filter rich to release NOx and active-oxygen from the NOx absorber to purify the released NOx by reduction, and to oxidize the particulates trapped on the filter by the released active-oxygen. As indicated in the translated Abstract, the heating in the NOx releasing and reduction causes elevated temperature in the filter, which induces the trapped soot to be oxidized easily. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have replaced the NOx absorber and the particulate filter in Dou et al. with the catalyzed particulate filter taught by Hirota et al., since the application thereof would have reduced spacing in the device and saved fuel by inducing soot to combust at an earlier time.

Hirota et al., however, fail to teach or suggest that the trapped soot is oxidized without producing a luminous flame.

Since the heating in the NOx releasing and reduction in Hirota et al. causes elevated temperature in the filter, which induces the trapped soot to be oxidized easily, the trapped soot is also oxidized at a lower temperature. One with ordinary skill in the art also recognizes that at a lower temperature, the trapped soot in Hirota et al. is oxidized without producing a luminous flame. Moreover, since the particulate filter in Hirota et al. is operated in an exact manner as that in the pending application to oxidize the trapped soot, there is a similar functionality between Hirota et al. and the pending application. This similar functionality leads one with ordinary skill in the art to realize that the trapped soot in Hirota et al. is also oxidized without producing a luminous flame.

Re claim 5, in the modified device of Dou et al., the catalytic apparatus (3) carries the catalyst (noble metals, barium) for absorbing and reducing NOx, and during the recovery process of the SOx pollution of the catalytic apparatus, the bypassing means (5A) makes the exhaust gas bypass the catalyzed particulate filter (see the last 8 lines of paragraph 0062).

Re claim 6, in the modified device of Dou et al., the catalytic apparatus (3) carries the catalyst (noble metals, barium) for absorbing and reducing NOx, and immediately after the finishing of the recovery process of the SOx pollution of the catalytic apparatus, the bypassing means (5A) does not make the exhaust gas bypass the catalyzed particulate filter and thus the exhaust gas passes through the catalyzed particulate filter.

Response to Arguments

8. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

Re claim 1, in response to applicant's argument that the combination of Hirota et al. and Seto et al. is improper because Hirota et al. fail to disclose or teach a catalyst for absorbing and reducing NOx on a location upstream side of a partition wall of a particulate filter (page 8 of Applicant's Amendment), the examiner respectfully disagrees.

As shown in Figures 1-2, Hirota et al. disclose or teach a particulate filter (10) which is a wall-flow device comprising a plurality of partition walls (regions having forward slashes) having pores, wherein the partition walls clearly carry a NOx absorber (26) on the exhaust gas upstream side surface of the partition walls for absorbing and reducing NOx. Thus, Hirota et al. clearly disclose or teach the claim limitation in dispute.

Re claim 1, in response to applicant's argument that the combination of Hirota et al. and Seto et al. is still improper because the particulate filter (10) in Hirota et al. is most likely being used to replace the upstream catalytic apparatus (17) in Seto et al. (pages 9-10 of Applicant's Amendment), the examiner again respectfully disagrees.

A typical NOx absorbent such as the one (20) in Seto et al. has an optimum operating temperature range that is below the exhaust gas temperature exiting an on-going regenerated particulate filter. Thus, if Seto et al. were to replace the upstream catalytic converter (17) with the particulate filter (10) of Hirota et al., the downstream NOx absorbent (20) in Seto et al. would not purify NOx effectively because the exhaust gas temperature entering the NOx absorbent would be too high and thus, an inadvertent release of the harmful NOx into the atmosphere would occur. Consequently, it would be much more beneficial to replace the NOx absorbent (20) in Seto et al. with the particulate filter (10) taught by Hirota et al. to at least prevent such inadvertent release of harmful NOx into the atmosphere.

Re claim 1, in response to applicant's argument that the combination of Hirota et al. and Seto et al. is still improper because none of the references teaches or suggests a control means to make the air-fuel ratio in the particulate filter rich to release NOx and active-oxygen from the NOx absorber to purify the released NOx by reduction, and to oxidize the particulates trapped on the filter by the released active-oxygen so that the trapped soot is oxidized without producing a luminous flame (pages 11-12 of Applicant's Amendment), the examiner again respectfully disagrees.

As shown in Figure 3B, Hirota et al. teach that when an exhaust gas is made rich of stoichiometry to release the trapped NOx from the NOx absorber (26), a reducing reaction

occurs in which the trapped NO_3 compounds give up an oxygen atom to become NO_2. As indicated in the translated abstract, the trapped particulate matter in the filter walls are easily ignited by the heat and obviously, by the excess oxygen given up from the release of trapped NOx from the NOx absorber. And as indicated above, the heating during the NOx release in Hirota et al. causes elevated temperature in the filter, which induces the trapped soot to be oxidized easily at a lower temperature. One with ordinary skill in the art should recognize that at a lower temperature, the trapped soot in Hirota et al. is oxidized without producing a luminous flame. Therefore, Hirota et al. teach or suggest the claimed limitation in dispute.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tu M. Nguyen

TMN

April 29, 2006

Tu M. Nguyen

Primary Examiner

Art Unit 3748